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Report Summary:

<u>nlights</u>	<u>January 1, 2018</u>	<u>January 1, 2020</u>	
Contributions			
Funding Schedule FY 2021	\$6,755,537	\$6,755,537	
Funding Schedule FY 2022	7,105,537	7,500,000	
Funded Ratios			
GAS No. 25	87.2%	80.4%	
<u>Participants</u>			
Actives	706	756	
Retirees and Beneficiaries	407	434	
Inactives	273	315	
Disabled	<u>30</u>	<u>30</u>	
Total	1,416	1,535	
<u>Payroll</u>			
Payroll of Active Members	\$38,607,665	\$43,862,455	
Average Payroll	54,685	58,019	
Normal Cost			
Employer	\$1,153,590	\$1,201,190	
Employee	3,439,198	3,941,231	
Administrative Expenses	<u>250,000</u>	275,000	
Total	\$4,842,788	\$5,417,421	
Actuarial Accrued Liabilities			
Actives	\$77,684,680	\$82,657,349	
Retirees, Beneficiaries, Disabilities and Inactives	110,476,504	139,424,809	
Total	\$188,161,184	\$222,082,158	
Actuarial Value of Assets	163,999,576	178,655,179	
Unfunded Actuarial Accrued Liabilities	\$24,161,608	\$43,426,979	

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2020, of Lexington Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2020.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Lexington Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2020.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The
 cost of these benefits has been assumed by the State under Proposition Two and
 One-Half.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last two years, based on the 2018 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability increased by 34.8% to \$32,579,187. The increase is the result of net unfavorable actuarial experience during the preceding years. The sources of actuarial (gains) and losses are as follows:

Assets	3,121,585
Retirements	2,575,187
Terminations	(2,203,171)
Death while active	(95,444)
Disabled while active	(878,829)
Salary	1,880,772
New Participants	2,816,046
Inactive Mortality and data	9,377,276
Other	(58,338)
Benefit Payments	3,093,514
Total (Gain) / Loss	19,628,598

The mortality assumptions were changed to the new SOA Public Sector tables. This added \$10,847,792 to the unfunded liability, and \$33,356 to the Normal Cost.

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Actuarial Costs and Liabilities:

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

T	able I	
	<u>January 1, 2018</u>	January 1, 2020
Superannuation	\$2,808,076	\$3,247,901
Termination	970,385	1,104,289
Death	309,078	223,611
Disability	505,249	566,620
Administrative Expenses	<u>\$250,000</u>	\$275,000
Total Normal Cost	\$4,842,788	\$5,417,421
% of Pay	12.5%	12.4%
Employee Contributions	\$3,439,198	\$3,941,231
% of Pay	8.9%	9.0%
Employer Normal Cost	\$1,403,590	\$1,476,190
% of Pay	3.6%	3.4%

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Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

Table II		
	<u>January 1, 2018</u>	January 1, 2020
Actives		
Superannuations	\$75,057,898	\$80,727,539
Termination	(2,024,271)	(2,261,337)
Death	2,090,176	1,377,709
Disability	2,560,877	2,813,438
Retirees and Inactives		
Retirees and Beneficiaries	\$97,617,687	\$124,882,957
Terminated (Refund)	2,773,088	3,240,410
Disabled	10,085,729	11,301,442
Total	\$188,161,184	\$222,082,158

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Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

Table III		
	January 1, 2018	January 1, 2020
Actives		
Superannuation	\$97,857,460	\$108,083,136
Termination	\$5,966,784	7,168,627
Death	\$4,423,429	3,216,998
Disability	\$7,153,407	8,310,091
Retirees and Inactives		
Retirees and Beneficiaries	\$97,617,687	\$124,882,957
Terminated (Refund)	\$2,773,088	3,240,410
Disabled	\$10,085,729	11,301,442
Total	\$225,877,584	\$266,203,661

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Funded Status and Appropriations:

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV						
	<u>January 1, 2018</u>	January 1, 2020				
Cash equivalents	\$71,758	\$8,100,970				
Fixed income securities	14,987,415	2,108,006				
Equities	70,926,422	70,571,232				
International	37,228,351	27,744,188				
Real Estate	8,868,925	16,321,944				
Other	35,488,804	59,774,062				
PRIT Fund	0	0				
Accounts receivable	3,013,053	3,336,722				
Accounts payable	(81,939)	(110,957)				
Accrued income	<u>1,875</u>	<u>12,104</u>				
Total Market Value	\$171,608,374	\$187,858,271				
Total Actuarial Value	\$163,999,576	\$178,655,179				

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Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (7.5%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a four year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 20%. The calculation of the actuarial value of assets as of January 1, 2020 is presented in Table V.

Table V

		<u>January 1, 2020</u>
(1)	Market value at January 1, 2019	\$160,945,602
(2)	2019 Contributions	\$11,898,757
(3)	2019 Payments	(\$15,358,967)
(4)	Net interest adjustment at 7.5% on (1), (2), and (3) to December 31, 2019	\$11,941,162
(5)	Expected market value on January 1, 2020	\$169,426,554
	(1) + (2) + (3) + (4)	
(6)	Actual market value on January 1, 2020	\$187,858,271
(7)	2019 (Gain) / Loss	(\$18,431,717)
(8)	80% of 2019 (Gain) / Loss	(\$14,745,373)
(9)	2018 (Gain) / Loss	\$19,663,312
(10)	60% of 2018 (Gain) / Loss	\$11,797,987
(11)	2017 (Gain) / Loss	(\$16,733,629)
(12)	40% of 2017 (Gain) / Loss	(\$6,693,452)
(13)	2016 (Gain) / Loss	\$2,188,730
(14)	20% of 2016 (Gain) / Loss	\$437,746
(15)	Actuarial value on January 1, 2020, $(6) + (8) + (10) + (12) + (14)$	
	but not less than 80% nor greater than 120% of (6)	\$178,655,179
(16)	Ratio of actuarial value to market value	95.10%
(17)	Actuarial Value Return for 2018	8.35%
(18)	Actuarial Value Return for 2019	5.74%
(19)	Market Value Return for 2018	19.02%
(20)	Market Value Return for 2019	-4.08%

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Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

T	able VI		
		January 1, 2018	<u>January 1, 2020</u>
Actuarial Accrued Liability		\$188,161,184	\$222,082,158
Actuarial Assets		163,999,576	178,655,179
Unfunded Actuarial Accrued Liability		\$24,161,608	\$43,426,979
Funded Status		87.2%	80.4%

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Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2027 \$43,426,979 over 7 years with increasing payments
- Interest adjustment for payments contributed quarterly over fiscal year.

The Board has elected to adopted a Funding Schedule that increases per year, then reverts back to the normal year-to-year increases in payments. The pension appropriation is shown in Table VII.

Table VII		
	<u>January 1, 2018</u>	<u>January 1, 2020</u>
Normal cost	\$1,403,590	\$1,476,190
Amortization payment of the accrued liability	4,317,156	6,742,835
Amortization payment of ERI liability	0	0
Amortization payment of Holiday liability	<u>0</u>	<u>0</u>
Total cost	\$5,720,746	\$8,219,025
% of Pay	14.8%	18.7%
Fiscal 2021 cost	\$6,755,537	\$6,755,537
Fiscal 2022 cost	\$7,105,537	\$7,500,000

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 4.5% per year. The employee contribution rate is expected to increase to 10.5% by 2037 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 7 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 16% of payroll, increasing to about 19% by the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 2.5% thereafter. The decrease in the cost as a percentage of payroll is a result of the increase in member deductions.

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Appropriation Forecast

Fiscal		Employer	Amortization	Employer	Employer	Unfunded	
Year	Employee	Normal Cost	Payments	Total Cost	Total Cost	Actuarial	Funded
Ending	Contribution	with Interest	with Interest	with Interest	% of Payroll	Liability	Ratio %**
2021	\$3,941,231	\$1,572,302	\$5,183,235	\$6,755,537	15.4	\$45,425,591	79.5
2022	4,159,423	1,599,560	5,900,440	7,500,000	16.4	41,583,964	81.8
2023	4,389,271	1,626,088	6,623,912	8,250,000	17.2	38,852,964	83.5
2024	4,631,383	1,651,764	7,348,236	9,000,000	18.0	35,161,600	85.5
2025	4,886,396	1,676,458	8,073,542	9,750,000	18.6	30,437,927	87.8
2026	5,154,983	1,700,029	8,799,971	10,500,000	19.2	24,604,510	90.4
2027	5,437,847	1,722,327	9,527,673	11,250,000	19.7	17,578,002	93.3
2028	5,735,730	1,743,190	9,268,691	11,011,881	18.4	9,268,691	96.6
2029	6,049,410	1,762,442	0	1,762,442	2.8	0	100.0
2030	6,379,707	1,779,897	0	1,779,897	2.7	0	100.0
2031	6,727,481	1,795,355	0	1,795,355	2.6	0	100.0
2032	7,093,636	1,808,599	0	1,808,599	2.5	0	100.0
2033	7,479,121	1,819,399	0	1,819,399	2.4	0	100.0
2034	7,884,936	1,827,509	0	1,827,509	2.4	0	100.0
2035	8,312,128	1,832,665	0	1,832,665	2.3	0	100.0
2036	8,761,801	1,834,583	0	1,834,583	2.2	0	100.0
2037	9,235,112	1,832,964	0	1,832,964	2.1	0	100.0
2038	9,733,279	1,827,484	0	1,827,484	2.0	0	100.0
2039	10,171,277	1,909,720	0	1,909,720	2.0	0	100.0
2040	10,628,984	1,995,658	0	1,995,658	2.0	0	100.0
2041	11,107,288	2,085,462	0	2,085,462	2.0	0	100.0
2042	11,607,116	2,179,308	0	2,179,308	2.0	0	100.0
2043	12,129,436	2,277,377	0	2,277,377	2.0	0	100.0
2044	12,675,261	2,379,859	0	2,379,859	2.0	0	100.0
2045	13,245,648	2,486,953	0	2,486,953	2.0	0	100.0
2046	13,841,702	2,598,866	0	2,598,866	2.0	0	100.0
2047	14,464,579	2,715,814	0	2,715,814	2.0	0	100.0
2048	15,115,485	2,838,026	0	2,838,026	2.0	0	100.0
2049	15,795,681	2,965,737	0	2,965,737	2.0	0	100.0
2050	16,506,487	3,099,196	0	3,099,196	2.0	0	100.0
2051	17,249,279	3,238,659	0	3,238,659	2.0	0	100.0
2052	18,025,497	3,384,399	0	3,384,399	2.0	0	100.0

^{**} As of 1/1 prior to beginning of fiscal year

EXHIBITS

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Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2020

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	0 0	0 0	0 0	0 0	0 0	0	0 0	0 0	0 0	0 0
20-24	33 36,768	0	0	0	0	0 0	0	0 0	0	33 36,768
25-29	96 42,892	5 59,345	0	0	0	0 0	0	0	0	101 43,707
30-34	62 53,919	22 63,212	7 75,308	0	0 0	0 0	0 0	0 0	0	91 57,811
35-39	33	17	12	5	0	0	0	0	0	67
	55,497	62,057	73,422	82,651	0	0	0	0	0	62,398
40-44	32	16	7	9	1	0	0	0	0	65
	51,608	66,406	87,069	96,103	81,074	0	0	0	0	65,684
45-49	26	15	13	8	12	2	1	0	0	77
	43,324	62,302	61,530	85,832	97,608	141,260	0	0	0	66,399
50-54	46	17	19	12	12	3	9	0	0	118
	45,729	58,163	70,034	84,232	84,930	101,767	88,883	0	0	64,052
55-59	20	20	21	14	14	7	9	3	0	108
	43,908	49,780	52,934	63,136	64,699	96,468	78,681	122,264	0	60,419
60-64	8	8	17	12	9	7	6	1	1	69
	43,124	51,655	54,714	57,396	58,843	83,384	70,046	66,996	56,770	58,470
65-69	1	3	4	6	2	5	0	0	0	21
	132,205	35,337	47,571	37,160	43,992	52,147	0	0	0	47,628
70+	0	0	1	1	1	2	1	0	0	6
	0	0	30,070	0	83,164	33,447	43,106	0	0	48,848
Total Employees	357	123	101	67	51	26	26	4	1	756
Average Salary	46,897	58,886	63,469	71,213	76,040	83,631	75,825	108,447	56,770	58,005

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Exhibit 2 - Retiree Distribution as of January 1, 2020

	Number	of Employ	ees	Total	Payments	
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	0	0	0	0	0
45-49	1	0	1	26,984	0	26,984
50-54	2	3	5	65,578	181,614	247,191
55-59	8	16	24	191,032	659,296	850,328
60-64	25	31	56	562,515	1,559,715	2,122,230
65-69	47	32	79	1,203,679	1,708,356	2,912,035
70-74	61	27	88	1,392,024	1,098,873	2,490,896
75-79	50	25	75	819,326	934,855	1,754,180
80-84	29	21	50	535,024	702,814	1,237,838
85-89	19	10	29	293,812	373,292	667,104
90-94	13	4	17	192,795	108,071	300,866
95+	7	3	10	58,366	92,387	150,753
tal	262	172	434	5,341,133	7,419,272	12,760,406
verage (Age/Payment)	74.94	71.72	73.67	20,386	43,135	29,402
equency Percent	60.4	39.6	100.0	41.9	58.1	100.0

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Exhibit 3 - Disabled Retiree Distribution as of January 1, 2020

	Number	of Employe	ees	Total	Payments	
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	1	1	0	51,346	51,346
40-44	1	0	1	49,817	0	49,817
45-49	0	1	1	0	38,139	38,139
50-54	0	2	2	0	58,137	58,137
55-59	0	4	4	0	180,326	180,326
60-64	1	5	6	22,406	232,550	254,957
65-69	0	3	3	0	109,309	109,309
70-74	1	1	2	29,098	38,390	67,488
75-79	1	4	5	13,816	103,000	116,816
80-84	1	2	3	17,866	60,084	77,950
85-89	0	1	1	0	24,921	24,921
90-94	0	0	0	0	0	0
95-99	1	0	1	11,925	0	11,925
al	6	24	30	144,928	896,203	1,041,131
verage (Age/Payment)	73.3	65.5	67.0	24,155	37,342	34,704
equency Percent	20.0	80.0	100.0	13.9	86.1	100.0

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EXHIBIT 4 - CASH FLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net change in plan assets
2020	\$15,235,602	\$3,941,231	\$6,755,537	\$14,768,118	\$10,229,283
2021	15,740,267	4,159,423	7,500,000	13,404,091	9,323,247
2022	16,224,130	4,389,271	8,250,000	14,121,167	10,536,308
2023	16,702,053	4,631,383	9,000,000	14,928,795	11,858,125
2024	17,250,669	4,886,396	9,750,000	15,832,290	13,218,017
2025	17,796,615	5,154,983	10,500,000	16,837,193	14,695,561
2026	18,326,478	5,437,847	11,250,000	17,952,806	16,314,175
2027	18,852,043	5,735,730	11,011,881	19,757,392	17,652,960
2028	19,311,676	6,049,410	1,762,442	20,374,888	8,875,064
2029	19,777,269	6,379,707	1,779,897	21,029,390	9,411,725
2030	20,272,825	6,727,481	1,795,355	21,723,478	9,973,489
2031	20,780,799	7,093,636	1,808,599	22,459,710	10,581,146
2032	21,301,501	7,479,121	1,819,399	23,241,546	11,238,565
2033	21,835,249	7,884,936	1,827,509	24,072,736	11,949,931
2034	22,382,372	8,312,128	1,832,665	24,957,345	12,719,766
2035	22,943,205	8,761,801	1,834,583	25,899,784	13,552,964
2036	23,518,090	9,235,112	1,832,964	26,904,826	14,454,812
2037	24,107,379	9,733,279	1,827,484	27,977,645	15,431,029
2038	24,711,435	10,171,277	1,909,720	29,118,230	16,487,792
2039	25,330,626	10,628,984	1,995,658	30,337,760	17,631,776
2040	25,965,332	11,107,288	2,085,462	31,642,778	18,870,196
2041	26,615,942	11,607,116	2,179,308	33,040,361	20,210,843
2042	27,282,854	12,129,436	2,277,377	34,538,175	21,662,134
2043	27,966,477	12,675,261	2,379,859	36,144,515	23,233,158
2044	28,667,229	13,245,648	2,486,953	37,868,360	24,933,731
2045	29,385,540	13,841,702	2,598,866	39,719,423	26,774,451
2046	30,121,850	14,464,579	2,715,814	41,708,216	28,766,759
2047	30,876,609	15,115,485	2,838,026	43,846,102	30,923,004
2048	31,650,280	15,795,681	2,965,737	46,145,380	33,256,517
2049	32,712,579	16,506,487	3,099,196	48,609,426	35,502,530

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2020, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

- (i) Group 1: Most general employees in State and local government
- (ii) Group 2: Certain specified hazardous duty positions
- (iii) Group 3: State police officers and inspectors
- (iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. Salary

Salary is defined as gross regular compensation. Salary <u>does not</u> include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. Member Contributions

Member contributions vary depending upon date hired as follows:

Date of Hire	Member <u>Contribution Rate</u>	
Prior to 1975	5.0% of Salary	
1975 to 1983	7.0% of Salary	
1984 to 1996	8.0% of Salary	
1996 and Later plus	9.0% of Salary	
1979 and Later	2.0% of Salary in excess of \$3	30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. Average Salary

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. <u>Creditable Service</u>

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. Service Retirement

a. Eligibility:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

- (i) completion of 20 years of service, if hired before April 2, 2012
- (ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member
- (iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service
- (iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

Age at	Perce	Percentage of Average Salary				
Retirement	Group 1	Group 2	Group 4			
65 or Over	.025	.025	.025			
64	.024	.025	.025			
63	.023	.025	.025			
62	.022	.025	.025			
61	.021	.025	.025			
60	.020	.025	.025			
59	.019	.024	.025			
58	.018	.023	.025			
57	.017	.022	.025			
56	.016	.021	.025			
55	.015	.020	.025			
54	.014	.014	.024			
53	.013	.013	.023			
52	.012	.012	.022			
51	.011	.011	.021			
50	.010	.010	.020			
49	.009	.009	.019			
48	.008	.008	.019			
47	.007	.007	.017			
46	.006	.006	.016			
40	.000	.000	.010			
45	.005	.005	.015			
44	.004	.004	.004			
43	.003	.003	.003			
42	.002	.002	.002			
41	.001	.001	.001			

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

Age at	Percer	ntage of Average	Salary
Retirement	Group 1	Group 2	Group 4
(7, 0	0250	0250	0250
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at	Percentage of Average Salary			
Retirement	Group 1	Group 2	Group 4	
67 or Over	.02500	.02500	.02500	
66	.02375	.02500	.02500	
65	.02250	.02500	.02500	
64	.02125	.02500	.02500	
63	.02000	.02500	.02500	
62	.01875	.02500	.02500	
61	.01750	.02375	.02500	
60	.01625	.02250	.02500	
59	.01023	.02125	.02500	
58		.02000	.02500	
57		.01875	.02500	
56		.01750	.02375	
55		.01625	.02250	
54			.02125	
53			.02000	
50			01055	
52			.01875	
51			.01750	
50			.01625	

8. <u>Deferred Vested Retirement</u>

a. <u>Eligibility</u>:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions with interest.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus \$450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. Eligibility:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of \$500 per month to the surviving spouse, plus \$120 for the first child, plus \$90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of \$500 per month plus \$120 for the first child and \$90 for each additional child.

c. <u>Refund of Contributions</u>:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. <u>Cost-of-Living Increases</u>

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is \$14,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

- (i) Option A Life annuity
- (ii) Option B Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member
- (iii) Option C Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 6 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below. They are based on the 2015 Experience Study performed by Sherman Actuarial Services, LLC.

1. Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. Valuation Date

January 1, 2020.

3. Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.5% per annum. This includes a 3% inflation assumption.

5. Salary Scale

It is assumed that salaries including longevity will increase as follows per year:

<u>Service</u>	<u>Group 1</u>	Group 4
0	0.0575	0.0625
1	0.0525	0.0575
2	0.0525	0.0525
3	0.0475	0.0475
4	0.0475	0.0425
5	0.0425	0.0425
6	0.0425	0.0375
7	0.0375	0.0375
8	0.0375	0.0350
9+	0.0350	0.0350

6. <u>Cost-of-Living Increases</u>

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and \$14,000 per year.

7. <u>Value of Investments</u>

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a five-year smoothing of asset returns greater than or less than the assumed rate of return.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

	General	Police and Fire
Service	Employees	Employees
0	0.2080	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
30	0.0000	0.0000

9. Annual Rate of Mortality

It is assumed that mortality for is represented by the various SOA Pub-2010 Public Retirement Plans Mortality Tables specific to the Group, Pre-retirement versus Post, Disabled and Beneficiaries, with Scale MP-2019 improvements until 2025.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

	Male	Female	Male and Female
	General	General	Police and Fire
<u>Age</u>	Employees	Employees	Employees
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.00000
66	0.2682	0.1959	1.00000
67	0.2500	0.2000	1.00000
68	0.2500	0.2000	1.00000
69	0.2500	0.2000	1.00000
70 to 76	0.2500	0.2500	1.00000
77 to 79	0.3500	0.2500	1.00000
80	1.0000	1.0000	1.00000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

<u>Age</u>	Male General <u>Employees</u>	Female General <u>Employees</u>	Male and Female Police and Fire <u>Employees</u>
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	0.2500
66	0.1224	0.1038	0.3000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70	0.2615	0.1939	1.0000
70 to 76	0.2682	0.1959	1.0000
77 to 79	0.2500	0.2000	1.0000
80	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained <u>Age</u>	General Employees	Police and Fire Employees
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 20% of all disabilities are ordinary (80% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2020 is \$275,000 and is anticipated to increase at 4.5% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. Actuarial Accrued Liability

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

3. Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. Actuarial Present Value

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. Forecast

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

6. Normal Cost

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

7. Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

8. Valuation Method

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

9. Vested Liability

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

CERTIFICATION:

This report fairly represents the actuarial position of the Lexington Retirement System contributing as of January 1, 2020, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC

Daniel W. Therman

Daniel W. Sherman, ASA, MAAA

September, 2020

BREAKOUTS

https://shermanactuary-my.sharepoint.com/personal/dan_shermanactuary_com/Documents/Recovered Data/Lexington/2020[Lexington/20_Val Prop Mortality.xlsm]Actuarybreak

Breakouts

	<u>Total</u>	School Administration	<u>General</u>	Fire and Police	Housing <u>Authority</u>	Sewer and <u>Water</u>	Recreation
(1) Payroll of Active Participants	\$43,862,455	\$14,389,352	\$17,538,185	\$10,023,878	\$477,806	\$831,945	\$601,290
Pecentage of Total Payroll	100.00%	32.81%	39.99%	22.85%	1.09%	1.90%	1.37%
(2) Actuarial Accrued Liability	\$222,082,158	\$38,901,717	\$89,232,112	\$82,802,284	\$2,251,294	\$5,706,034	\$3,188,716
(3) Assets	\$178,655,179	\$31,294,694	\$71,783,249	\$66,610,740	\$1,811,065	\$4,590,250	\$2,565,180
(4) Unfunded Actuarial Accrued Liability	\$43,426,979	\$7,607,023	\$17,448,863	\$16,191,544	\$440,229	\$1,115,784	\$623,536
(5) Total Employer Contributions							
(a) Amortizations	6,742,835	1,181,130	2,709,257	2,514,034	68,354	173,246	96,815
(b) Employer Normal Cost	1,201,190	355,802	311,121	516,203	16,087	8,488	(6,512)
(c) Administrative Expenses	<u>275,000</u>	90,217	<u>109,961</u>	<u>62,846</u>	<u>2,995</u>	<u>5,217</u>	<u>3,770</u>
(d) Total Appropriation	8,219,025	1,627,149	3,130,339	3,093,083	87,436	186,951	94,073
Percent of Total Appropriation	100.00%	19.80%	38.09%	37.63%	1.06%	2.27%	1.14%
(6) Fiscal 2021 Appropriation	\$6,755,537	\$2,184,741	\$2,667,220	\$1,577,148	\$76,338	\$152,810	\$97,280
Percent of Total Appropriation	100.00%	30.29%	41.15%	23.97%	1.12%	1.91%	1.56%
(7) Fiscal 2022 Appropriation	\$7,500,000	\$2,460,450	\$2,998,939	\$1,713,975	\$81,675	\$142,275	\$102,825
Percent of Total Appropriation	100.00%	32.81%	39.99%	22.85%	1.09%	1.90%	1.37%
(8) Fiscal 2023 Appropriation	\$8,250,000	\$2,706,495	\$3,298,831	\$1,885,373	\$89,842	\$156,503	\$113,108
Percent of Total Appropriation	100.00%	32.81%	39.99%	22.85%	1.09%	1.90%	1.37%

Fiscal 2021 - 2023 Appropriations based on covered payroll.